Partnership Committee
on Agriculture and the Environment

Agricultural Watercourse Maintenance Guide

for

Lower Fraser Valley / Vancouver Island

June 15th, 2001

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BRITISH COLUMBIA
Ministry of Agriculture, Food and Fisheries

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Agricultural Watercourse Maintenance Guide

Lower Fraser Valley and Vancouver Island

TABLE OF CONTENTS

		Page
1.0	Background	5
2.0	Objective	6
3.0	Legislation	6
4.0	Ditch Maintenance Process	7
	Step 1 Identify Maintenance Needs	8
	Step 2 Watercourse Classification	8
	Step 3 Review DFO and MELP Requirements	12
	Step 4 Determine DFO and MELP Requirements	16
	Streams – Channelized and Natural	16
	Constructed Ditches	19
	Step 5 Timing Window	23
	Step 6 Conditions Specified for Maintenance of Constructed Ditches	25
	Vegetation Removal on Constructed Ditches	25
	Sediment Trap/Bail Hole Cleanout on Constructed Ditches	26
	Constructed Ditch Maintenance	27
	Clear Span Bridge Installation and/or Repairs over a Constructed Ditch	28
	Culvert Replacement or Extension on a Constructed Ditch	29
	Bank Stabilization on Constructed Ditches	30
	Construction and/or Replacement of "In Ditch" Structures	31
	Step 7 Guidelines on How to Conduct Works in Constructed Ditches	32
	Fish Salvaging for Constructed Ditches	32
	Sediment and Erosion Controls for Constructed Ditches	32
	Bank Stabilization for Constructed Ditches	35
	Ditch Cleaning Equipment and Operation	38
	Isolation of Water Flow	39
	Riparian Leave Areas	39
	Maintenance or Repair of Instream Structures on a Constructed Ditch	40
Appendix A	Legislation	41
Appendix B	Ditch Maintenance Form	43
Appendix C	Agency Contacts	44
Appendix D	Reference Information	46

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Agricultural Watercourse Maintenance Guide
–Lower Fraser Valley and Vancouver Island

This guide provides information that will enable agricultural producers and municipalities in the Lower Fraser Valley and Vancouver Island to conduct drainage maintenance activities on agricultural lands in a timely manner. At the same time the guide outlines a process that ensures the terms and legislative requirements of the Federal *Fisheries Act* and Provincial *Water Act* are not contravened.

Constructed ditch maintenance information is found on pages identified by a gray side bar.

1.0 BACKGROUND

Regional and on-farm drainage and irrigation infrastructure has been developed over the years with the aim of enhancing agricultural production. Ongoing maintenance of these systems is required in order for them to serve this intended purpose. Proponents carry the liability that is associated with conducting works and in ensuring that all maintenance activities are conducted in accordance with all applicable legislation.

The provincial Ministers of Agriculture and Food, and Environment, Lands and Parks agreed in 1998 that ditch maintenance in agricultural areas was one of several issues that required resolution through agreement by all stakeholders. The goal is to establish a guide that will balance farmers' needs for irrigation and drainage with the need to maintain fish habitat.

This Agricultural Watercourse Maintenance Guide is an initiative of the Partnership Committee on Agriculture and the Environment. Members include the British Columbia Agriculture Council, Union of BC Municipalities, Ministry of Environment, Lands and Parks, Ministry of Agriculture and Food, Environment Canada, Agriculture and Agri-Food Canada, and Fisheries and Oceans Canada. Initiated in 1998, the objective of the Partnership Committee is to foster communication between industry and government and to promote and develop solutions with regard to agricultural and environmental conflict.

The Partnership Committee recognizes that meeting agricultural and fishery goals come at a financial cost. While the agriculture industry is fully supportive of playing a direct role in maintaining and enhancing fish habitat, individual deeded landowners and municipalities should not be solely responsible for covering costs that result from going beyond legal requirements. The costs of stewardship should be shared. The agriculture industry and the various levels of government are therefore committed to a partnership that will develop processes and incentives to encourage stewardship initiatives.

2.0 OBJECTIVE

The objective of establishing this Agricultural Watercourse Maintenance Guide is to provide for adequate drainage and irrigation of productive agricultural lands while protecting valuable fishery resources. The guide is intended to provide farmers and municipalities with clear direction on how to proceed with maintenance works under various conditions. At the same time the guide will reduce the need for the Ministry of Environment, Lands and Parks (MELP) and Fisheries and Oceans Canada (DFO) to issue approvals, authorizations and/or letters of advice for routine maintenance of constructed agricultural drainage ditches. This is accomplished by streamlining contact requirements for constructed ditches through processes outlined in this guide, and the development of protocol agreements between proponents and the environmental agencies.

3.0 LEGISLATION

In British Columbia, Fisheries and Oceans Canada retains statutory authority for the protection of fish habitat and water quality pertaining to fish habitat under the federal *Fisheries Act*. The provincial government through the legislative mechanisms of the *Water Act* and *Fish Protection Act* manages some aspects of freshwater environments.

The *Fisheries Act* is Federal legislation established to manage and protect Canada's fisheries resources. The Habitat Provisions of the *Fisheries Act* (Sections 35 & 36) specifically address the protection of fish habitat, defined as those parts of the environment "on which fish depend, directly or indirectly, in order to carry out their life processes". The supporting Policy for the Management of Fish Habitat guides administration of the habitat protection provisions of the *Fisheries Act*, and applies to all projects and activities, large and small, in or near the water, that could alter, disrupt, or destroy fish habitats, by chemical, physical or biological means. The effects of watercourse maintenance activities on fish and fish habitat must, therefore, be addressed before a maintenance project is started. As Federal legislation, the *Fisheries Act* supersedes provincial legislation when the two are in conflict.

If it is unclear whether or not a proposed work will impact fisheries resources, early consultation with DFO is recommended to ensure that works are conducted in accordance with the *Fisheries Act*.

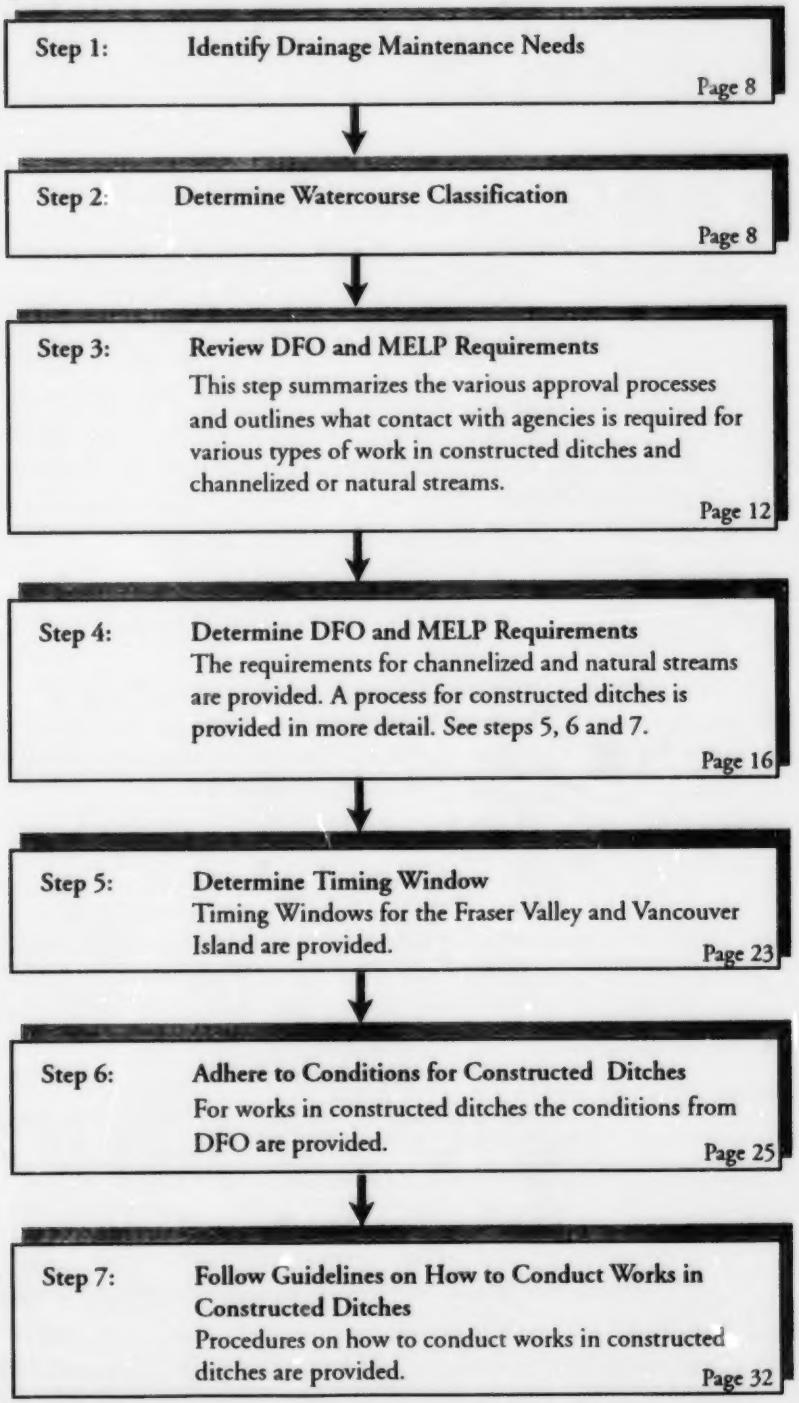
Appendix A provides further details about implementation of *Fisheries Act* habitat provisions, the *Water Act* and the *Fish Protection Act*.

It is the responsibility of the proponent to ensure that works conducted in or about a watercourse do not:

- result in the harmful alteration, disruption or destruction of fish habitat (unless such impacts have been authorized by DFO);
- cause the deposit of a deleterious substance into waters frequented by fish; harm or kill fish;
- impede fish passage; or
- restrict flows to fish-bearing habitat downstream of the work site.

4.0 WATERCOURSE MAINTENANCE PROCESS

Use the following steps to develop a drainage maintenance plan that accommodates both agricultural drainage and fishery requirements. Appendix C provides a list of contacts that may be able to provide assistance should clarification of any of the steps be required.


Step 1: Identify Drainage Maintenance Needs
Page 8
Step 2: Determine Watercourse Classification
Page 8
Step 3: Review DFO and MELP Requirements
This step summarizes the various approval processes and outlines what contact with agencies is required for various types of work in constructed ditches and channelized or natural streams.
Page 12
Step 4: Determine DFO and MELP Requirements
The requirements for channelized and natural streams are provided. A process for constructed ditches is provided in more detail. See steps 5, 6 and 7.
Page 16
Step 5: Determine Timing Window
Timing Windows for the Fraser Valley and Vancouver Island are provided.
Page 23
Step 6: Adhere to Conditions for Constructed Ditches
For works in constructed ditches the conditions from DFO are provided.
Page 25
Step 7: Follow Guidelines on How to Conduct Works in Constructed Ditches
Procedures on how to conduct works in constructed ditches are provided.
Page 32

Step 1: Identify Maintenance Needs

A maintenance schedule should be prepared that takes into account cropping rotation, flooding, type of work, measures to minimize maintenance requirements (e.g. erosion control, vegetation buffers) proposed timing of works and how often the works need to be done. Maintenance needs should be reassessed each year to determine if the maintenance schedule that has been prepared is still valid.

For large maintenance works it is always a good idea to prepare a plan. For larger farms the plan could form the basis of a protocol agreement with the agencies.

Step 2: Watercourse Classification

For the purpose of these guidelines, watercourse classification is based on the physical and hydrological watercourse parameters. The presence or absence of fish must also be determined. Together these factors will determine regulatory requirements as well as the conditions required for works to be conducted.

Contact your local government to see if watercourse classification maps are available. It is your responsibility to ensure that you are using the correct classification. Incorrectly classifying a watercourse may result in legal consequences. The following points should be considered in determining the correct watercourse classification:

- If the watercourse classification has been determined and fish presence information is available, go to step 3.
- If information is not available on fish presence, assume fish are present (unless ditch is dry).
- If watercourse classification information is not available for watercourse type, classify the watercourse on your property in accordance with the definitions provided below. If you are uncertain of your watercourse classification contact DFO or MELP. See Appendix C.

Constructed Ditches

Constructed ditches have no headwaters, only carry water from local surface areas or subsurface drains and may be permanently or intermittently wetted. These ditches have been primarily constructed for the purpose of removing excess water from farmland in order to improve crop production and farm viability. During summer months these channels may also be a source of irrigation water for farmland. Two or more constructed ditches may drain into a collector ditch. The collector ditch is considered a constructed ditch as long as it only drains other constructed ditches.

Constructed ditches, although not covered by the Provincial *Water Act*, are covered by the Federal *Fisheries Act* if fish depend directly or indirectly on them in order to carry out their life processes.

Constructed ditches may divert water away from a stream for the purpose of supplying an irrigation system and dead end. These types of constructed ditches are covered under the *Water Act* and must be appropriately screened to prevent fish access.

Constructed ditches include:

Dry Ditches – A dry ditch is defined as a ditch having a dry bottom. In coastal areas these ditches were primarily constructed to manage winter storm events. They do not usually have aquatic vegetation growth. Ditches that are normally dry but which temporarily impound water for irrigation (irrigation channels) using a control structure can be maintained using the dry ditch process providing:

- the control gate will prevent fish from accessing the constructed ditch
- there are no fish present in the constructed ditch, upstream of the control structure

Constructed ditches that have been blocked when dry to prevent fish access can:

- be maintained using the dry ditch process even if they fill with water after being blocked.
- extend the timing window to allow for maintenance later in the fall

The fish barrier must be removed when the work has been completed and no later than November 1st.

Wet Ditches – These ditches are wet all year round and carry water for drainage and irrigation purposes.

If a constructed ditch intercepts a groundwater source (e.g., spring) then special circumstances apply and the wet ditch could be considered a stream (refer to description below). Groundwater sources provide constant cool water temperatures that will act as a refuge for salmonids during periods of high water temperatures. In such circumstances DFO must be contacted prior to the commencement of any maintenance works.

Streams

Streams include all watercourses that are not classified as a constructed ditch. For the purpose of this guide streams include both channelized and natural watercourses. The *Water Act* and *Fisheries Act* do not differentiate between channelized or natural streams with respect to legislative or regulatory requirements for conducting works in and around a stream.

Channelized or Relocated Streams

Channelized streams are permanent or relocated streams that have been diverted, dredged, straightened and/or dyked. Channelized and relocated streams can be characterized by the following:

- have headwaters and may transport water from a spring or natural wet area;
- are an integral part of the natural drainage and may have good fish habitat;
- are likely to have aquatic vegetation growth and support aquatic invertebrates;
- display straight channels which may show signs of natural channel processes (e.g. meandering, pool and riffle development) if left undisturbed for a number of years; and/or
- typically flow along roadsides, property or field boundaries;

Channelized or relocated streams are covered under the *Water Act* of B.C. and the federal *Fisheries Act*. It is recognized that in some instances, channelized and/or relocated watercourses require maintenance to maintain hydraulic function and flow capacity. Routine maintenance of such watercourses requires long term planning.

Natural Streams

These are historic watercourses that have not been altered or have not recently been altered. Natural streams are covered under the *Water Act* of B.C. and the federal *Fisheries Act*. Natural streams can be characterized by one or more of the following:

- meandering channel;
- may or may not have riparian vegetation;
- instream submergent and emergent aquatic vegetation;
- pool and/or riffle habitat;
- variations in channel bed morphology e.g. organic materials, sands, gravels, or combinations thereof;
- evidence of water flow at some time of the year;
- limited evidence of channelling, relocation or other manipulation of the watercourse;
- support aquatic invertebrates; and
- function as fish habitat.

ARDSA Channels

Agri-Food Regional Development Subsidiary Agreement (ARDSA) Channels

The ARDSA Program was a joint Federal, Provincial and Municipal fund that provided grant money to improve drainage on farmland. Grants were available to construct dykes, pumping stations and new drainage channels to provide farmland with adequate drainage and irrigation.

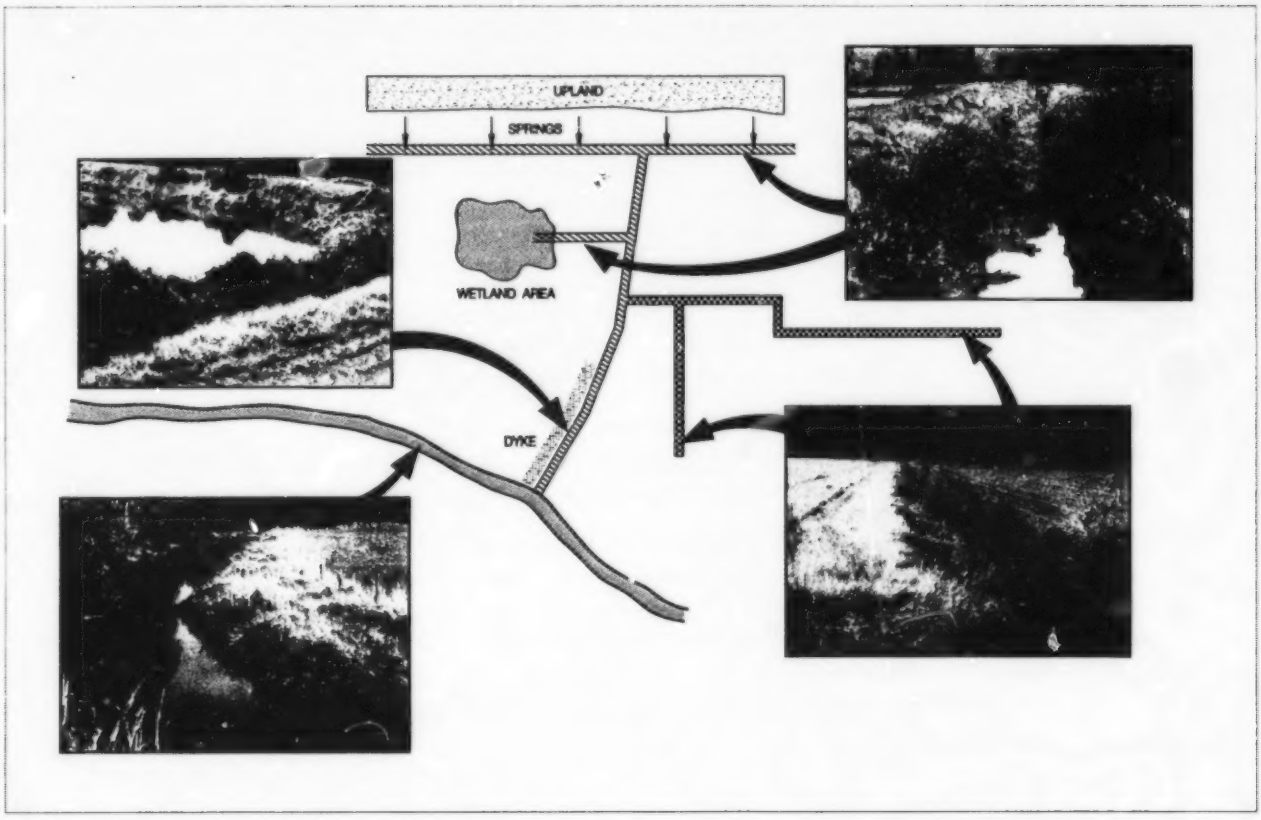
These drainage improvement works were intended to enable farmers to farm earlier in the year and to prevent frequent flooding. Farming in agricultural lowlands will not be viable if these watercourses are not maintained on a regular basis. ARDSA watercourses were constructed to the required depth and width to ensure water flow and volume facilitated the drainage of farm fields in the spring. Most of these projects were designed to provide a specific level of service. Often inverts and cross sections must be maintained to meet the ARDSA level of service.

Drainage design specifications and ongoing maintenance agreements were established by the ARDSA program for these works. Historically, reclaimed areas are included under these systems. Each municipality that participated in the program has a list of these watercourses, the agreements and their design drawings.

ARDSA watercourses may be natural streams or constructed ditches but are primarily channelized streams. ARDSA watercourse maintenance approvals may be administered under protocol agreements established between municipalities and environmental agencies. All works within ARDSA watercourses must be conducted in accordance with all applicable legislation.

Figure 1 graphically illustrates the relationship between the various types of watercourses.

Figure 1 – Watercourse Classification



Step 3 Review DFO and MELP Requirements

Prior to undertaking works in or near a constructed ditch, or stream (channelized or natural) it is necessary to determine if there are regulatory requirements that must be met prior to commencing works and/or any activity. This section outlines the type of approval that may be required under the *Fisheries Act* and/or the *Water Act*.

Where there is uncertainty with as to whether or not the proposed works will impact fish or fish habitat, individual producers or local governments should contact DFO for advice before proceeding with the proposed works.

In many situations individuals will be required to obtain documents from more than one agency (e.g., DFO authorization **and** MELP approval) before works can proceed in accordance with federal and provincial environmental legislation. Therefore, it is important to refer to Table 1 (for works in channelized or natural streams) and Table 2 (for works in constructed ditches) to determine the potential regulatory requirements for your proposed project.

The various regulatory requirements (i.e., no contact, agency contact, notifications, authorizations, and approvals for works) are described below.

No Agency Contact

Applies to: **Some works in Constructed Ditches**
Some works in streams under the Section 9 Part 7 Regulation

Works in dry constructed ditches can be done with no agency contact. Certain works in wet constructed ditches may be done without contacting MELP or DFO as outlined in Table 2. These works must be conducted during the appropriate Timing Window (refer to Table 3) and follow the conditions and guidelines provided in Steps 6 and 7.

For channelized and natural streams some work can be done without contacting the agencies, as outlined in Table 1.

Agency Contact Required – Use Ditch Maintenance Form

Applies to: **Wet Constructed Ditches**

A Ditch Maintenance Form (DMF) has been developed to simplify agency contact when required for works in constructed ditches. For works identified in Table 2 as requiring a DMF, the proponent must submit the Ditch Maintenance Form (Appendix B) to DFO so that it is received a minimum of **14 days** prior to the commencement of works.

Depending on the potential for the proposed works to impact fish or fish habitat, DFO staff may have concerns. If DFO has concerns, the proponent will be contacted and advised of how to proceed. If the proponent has not been contacted by DFO after fourteen days, the individual can begin the proposed works during the approved timing window and in accordance with the appropriate conditions in Step 6 and guidelines in Step 7.

The completed Ditch Maintenance Form can be faxed to the local DFO number shown in Appendix C, hand delivered or mailed to the corresponding address.

DFO Authorization

Applies to: **Channelized and Natural Streams**
Constructed Ditches outside the timing window
Constructed Ditches where work will result in a HADD

Authorization under the Federal *Fisheries Act* is necessary if the work will result in the harmful alteration, disruption or destruction (HADD) of fish habitat, and may be required for works in a constructed ditch, channelized or natural stream. Examples of HADDS include:

- Loss of riparian vegetation – Fish habitat features provided by riparian vegetation include insect drop, contribution of large woody debris, and shading to stabilize water temperature.
- Siltation which can smother fish spawning gravels, and benthic invertebrates that provide a food source for fish. .
- Removal of instream vegetation that can result in loss of fish shelter and food supply.
- Infilling of stream channel with debris causing a loss of living space and food supply.

An Authorization is a signed agreement between the proponent and DFO, which allows for specific impacts to fish habitat and outlines mitigation and compensation requirements. The decision of whether or not an Authorization will be issued is made by a DFO Habitat Biologist or Technician.

How to obtain an authorization:

To obtain an authorization from DFO the proponent must submit a clearly written proposal detailing the type of work to be done, justification for the proposed works, equipment to be used, extent of fish use and habitat type, mitigation measures, proposed habitat compensation and timing of work. This information must be submitted to DFO well in advance of the work being done (i.e. applications should be submitted by May 1st of any calendar year, in order to ensure adequate time for processing of the application prior to the Timing Window).

In order for DFO to determine whether or not an approval will be granted, a site visit to assess the proposed works may be required. Official correspondence may be issued as a "letter of advice" or an "authorization". For protocol agreements and long term plans letters of advice and/or authorizations may be issued for a term of longer than one year, thereby foregoing the necessity to apply on an annual basis.

In situations where the habitat impacts of the proposed works will be too great, DFO may choose not to issue an authorization for the proposed works.

MELP Notification Process

Applies to: **Channelized and Natural Streams**

A notification may suffice instead of an approval for certain works conducted in and about channelized and natural streams. Notifications are covered under Section 9 of the *Water Act*, Regulations Part 7. The Regulation requires written notification to the Ministry of Environment, Lands and Parks (MELP) for work in and about channelized and natural streams where:

- diversion of water is not required,
- the work may be completed within a short period of time; and
- the work has little impact on the environment.

Following the Regulation will help to protect water quality and quantity, aquatic and shoreline habitats, public safety, property rights and other licensed water users. The regulation addresses activities such as:

- Installation, maintenance or removal of:
  - stream culverts
  - clear span bridge
  - fences
  - pipeline crossings
  - beaver dams
- Repair or maintenance of:
  - dykes
  - vegetation by annual cutting

Government Agencies including municipalities may also conduct:

- stream channel restoration or maintenance projects

For a complete list of works requiring a Notification refer to the provincial *Water Act*. Also see Table 1 for additional guidance.

The following activities do not require MELP notification or approval, providing they are carried out in compliance with the Regulation:

- installation of drain tile outlets
- repair of the superstructure of a bridge

Notification requirements and the Regulation are noted in "A USERS GUIDE TO WORKING IN AND AROUND WATER". The users guide and notification forms are available at the Ministry of Environment, Lands and Parks regional offices. The Users Guide is also available on the internet at: www.elp.gov.bc.ca/wat/wrs/brochure.html. There is no fee required and the application form must be received at the regional office at least 45 days prior to start of the proposed activity. In the lower mainland it is requested that applications be submitted by May 1st so that applications can be processed in accordance with the timing window that has been established.

The MELP Habitat Officer will review the plans and may set specific conditions which must be followed in carrying out the work, including best management practices. In the lower mainland contact with DFO is done through MELP. On Vancouver Island it is the responsibility of the applicant to contact DFO. In both regions it is the proponent's responsibility to contact other relevant municipal or provincial authorities.

MELP Approval Process

Applies to: Channelized and Natural Streams

All proposed activities in channelized and natural watercourses that are not listed in the *Water Act* Regulations require an Approval. Approvals are legal documents issued under Section 9 of the *Water Act*.

Approvals for changes in and about a stream may be required for activities such as:

- surface drainage of farmland or a land development site;
- altering the channel of a stream; and
- placement of a bridge, culvert or other structure within a stream channel that does not meet the Regulation requirements.

Table 1 provides additional guidance on when approvals are required.

Approval forms are available from the Ministry of Environment, Lands and Parks regional offices. A fee of $130 must accompany the application. The Approval document will not be issued without payment. Completed applications must be submitted to MELP well in advance of the work being done. Applications should be submitted by May 1st of any calendar year, in order to ensure adequate time for processing of the application prior to the Timing Window.

The application will receive a technical review. Possible impacts on the interests of any other persons or agencies that may result from the proposed works will be assessed. The proposed work cannot proceed until an Approval document is issued.

PROTOCOL AGREEMENTS

Applies to: **Constructed Ditches**
ARDSA Channels
Channelized and Natural Streams

A Protocol Agreement is a standing legally binding agreement between Fisheries and Oceans Canada, MELP and the local municipality or other corporate entity that permits ongoing drainage maintenance works to be undertaken over a specified time period. Protocol Agreements specify the terms and conditions under which the drainage maintenance works may be undertaken and may set forth mitigation or compensation requirements within the context of a watershed or watershed sub-basin.

The objective of a Protocol Agreement is to allow for area-specific needs for drainage maintenance to be met while ensuring protection of fish and fish habitat. Protocol Agreements may be based on comprehensive long-term plans having schedules for ongoing maintenance works on an annual to 10-year basis. Protocol Agreements may specify work locations, types of maintenance works, quantities of works, work methodologies, timing windows or other specific maintenance requirements.

Protocol agreements may recognize area specific needs such as:

- the necessity for conducting works after the fall harvest of crops has been completed;
- municipal workload volumes, equipment and/ or machine operator availability, or other related constraints;
- specific channels which are primarily used for irrigation and which may require maintenance works after water levels are lowered;
- flood protection
- emergency work protocols
- the protection of fish and fish habitat

A protocol agreement that has been established with MELP and DFO will supercede the timing windows, conditions and guidelines, and contact requirements for constructed ditches as outlined here.

Step 4 Determine DFO and MELP Requirements

This step is divided into two sections. The first section provides the process for determining the regulatory requirements for conducting works in and about a **natural or channelized stream.**

The second section provides the process for **constructed ditches.** The conditions that must be followed for a constructed ditch is provided in Step 6.

4.1 Streams – Channelized and Natural

The process for determining the notification, approval or authorization requirements for works in and about a stream is shown in Figure 2. Table 1 provides guidance on the type of work that will require notification, approval or DFO authorization.

Figure 2 – Stream Maintenance Process

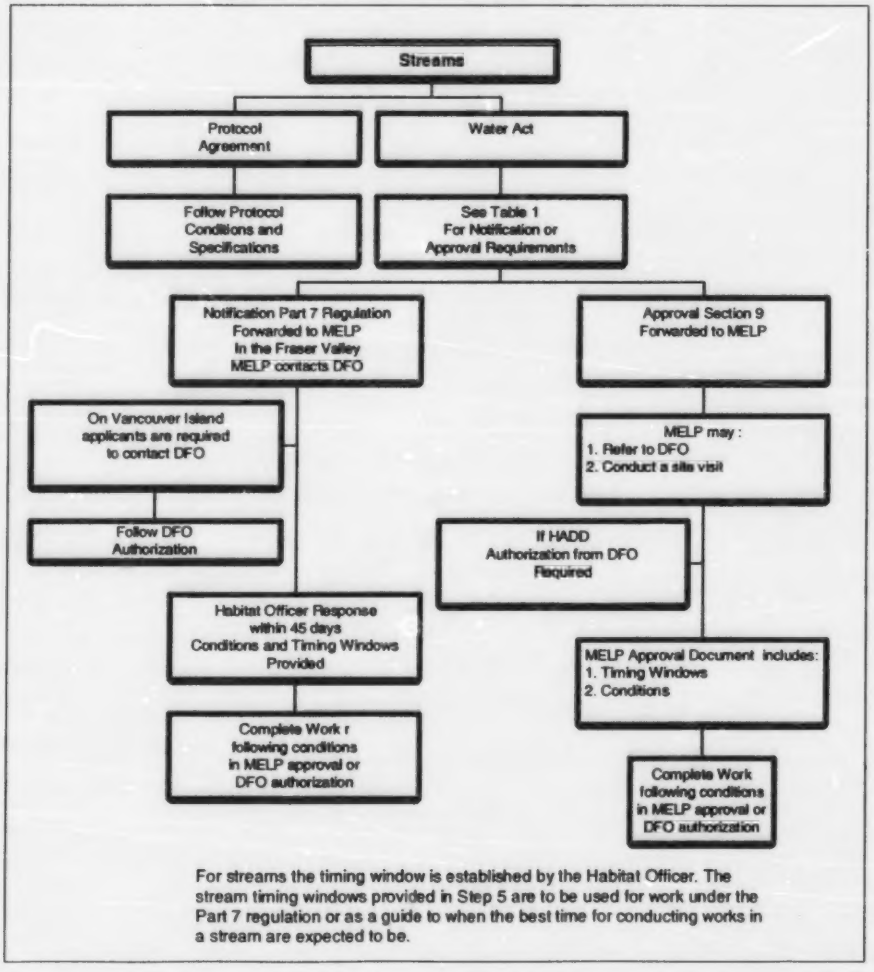
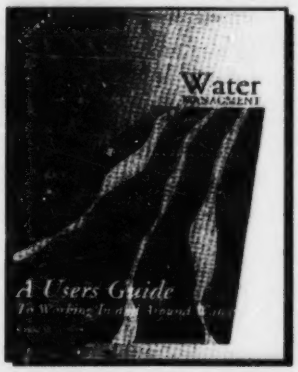

Streams
Protocol Agreement
Water Act
Follow Protocol Conditions and Specifications
See Table 1 For Notification or Approval Requirements
Notification Part 7 Regulation Forwarded to MELP In the Fraser Valley MELP contacts DFO
Approval Section 9 Forwarded to MELP
On Vancouver Island applicants are required to contact DFO
MELP may : 1. Refer to DFO 2. Conduct a site visit
Follow DFO Authorization
If HADD Authorization from DFO Required
Habitat Officer Response within 45 days Conditions and Timing Windows Provided
MELP Approval Document includes: 1. Timing Windows 2. Conditions
Complete Work r following conditions in MELP approval or DFO authorization
Complete Work following conditions in MELP approval or DFO authorization
For streams the timing window is established by the Habitat Officer. The stream timing windows provided in Step 5 are to be used for work under the Part 7 regulation or as a guide to when the best time for conducting works in a stream are expected to be.

Table 1 DFO and MELP Requirements for Channelized and Natural Stream Maintenance Work

Activity	Description	No Agency	DFO Authorizatio	MELP Notification	MELP Approval
Drain Tile Outlets	Installation or cleaning of drain tile outlets	X			
Fencing	Installation, repair, maintenance or removal of fences providing the fencing materials are not in the stream channel, do not block debris, do not require the removal of riparian vegetation and do not interfere with navigation of the stream.	X			
Bridge Installation / Repair	The repair or maintenance of a bridge excluding its foundation.	X			
	Construction of a clear span bridge for livestock or farm equipment where there is no loss of riparian vegetation and where no works will be undertaken below the top of bank. Extra documentation may be required.			X	
Culverts	New culvert installation for an access road crossing or the replacement of an access road culvert with a culvert of the same length.		X	X	
	Replacement of an access road culvert with a culvert of the same length or an increase in length of 50% (up to 12 meters in length maximum) if the culvert is increased in diameter.		X		X
Vegetation Removal	Mechanical or manual cutting of annual vegetation within a stream channel below the waterline		X	X	
	Pruning of riparian vegetation, which is overhanging into the wetted channel and obstructing water flow to a point above the high water mark.		X	X	
	Hand *cutting* or machine mowing of emergent aquatic vegetation to the waterline.		X	X	
	Hand *removal* of emergent aquatic vegetation from the thalweg (i.e. emergent aquatic vegetation along the edges of the watercourse is not disturbed)		X	X	
	Pruning of streamside vegetation or the removal of riparian vegetation beyond which is outlined in the conditions above.		X		X
	Machine removal of riparian vegetation along a stream only for the purpose of constructing an access for channel maintenance.		X		X
Bank Stabilization	Bank stabilization by planting vegetation and seeding with native grasses			X	
	Bank stabilization or repair by rip rap planted with vegetation, such as willows or other bio-engineered method.		X		X
Installation or Maintenance of Sediment Traps	Maintenance and / or cleanout of sediment traps according to guidelines		X	X	
	Installation of sediment traps and instream structures (e.g. weirs, dams, trash racks, etc.)		X		X
Channel Maintenance	Localized removal of blockages to stream flow (e.g. debris dams) by hand or any cleaning, dredging or drainage maintenance operations that require removal of material from the channel.		X		X
	Stream diversion or relocation		X		X
Instream Structures	Repair or maintenance or existing dykes or erosion protection works providing the works were functional the previous year.		X	X	
	Construction or maintenance of a pipeline crossing Beaver dam removal by machine		X X	X X	
	Replacement of instream structures, provided that the replacement structure is of the same size and function		X		X
	Construction of a livestock watering area, ford or crossing, consistent with codes, guidelines and BMP's		X		X
Emergency Works	Conducting emergency works according to an emergency works protocol		X	X	



Works in and about streams are regulated under Section 9, Part 7 of the *Water Act*. See Step 3 for additional information on the Part 7 *Water Act Regulation*. **Before conducting works and/or activities in and about a stream that are not listed in the above table contact MELP and/or DFO. Further information can also be found in MELP's publication "A Guide for Working in and Around Water".**

Fish salvage must be done prior to commencing works in a stream if fish are present. A fish salvage permit must be obtained from MELP and DFO.

The Referral Process for Works In and About a Stream (Natural or Channelized)

For works in and about a channelized or natural stream a MELP notification or approval may be required and DFO may need to issue an authorization (refer to Table 1). Therefore more than one document may be required (e.g., approval, authorization, etc.) before you would legally be able to proceed with your proposed work.

In the Lower Mainland, when an individual (i.e., proponent) submits a notification or an application to MELP for an Approval under Section 9 of the *Water Act*, MELP forwards the proposal to DFO for review (refer to Figue 2). On Vancouver Island, MELP notifications **are not** forwarded to DFO for review. It is, therefore, the proponent's responsibility to contact DFO directly when Table 1 shows that both a MELP notification and DFO authorization may be required.

For both regions it is the proponent's responsibility to ensure that he/she has all the necessary documents before proceeding with the proposed works.

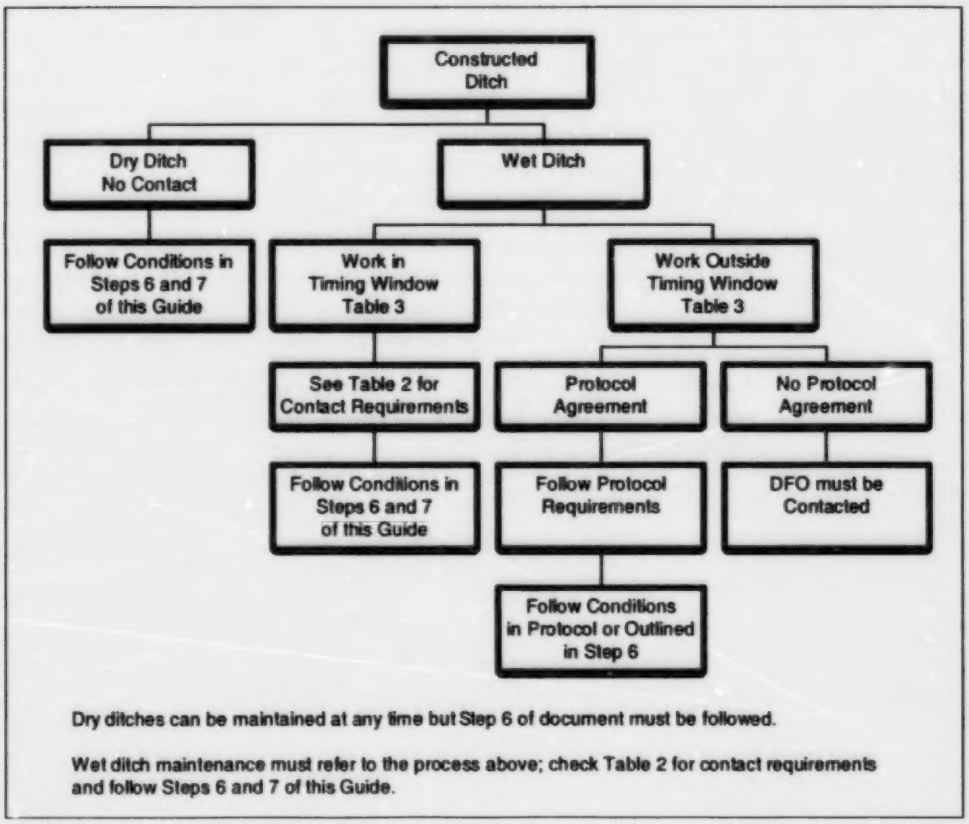
4.2 Constructed Ditches

Contact requirements for ditch maintenance works depends on the condition of the ditch (dry or wet) at the time the work is to be done. Figure 3 shows the process for proceeding with maintenance works on constructed ditches.

Dry Ditch Maintenance

Maintenance work on dry constructed ditches can be done without notification at any time. Wherever possible maintenance works on dry constructed ditches should be done during the summer months. If field access is a problem during summer months maintenance works on dry constructed ditches can be delayed to the fall if the ditch is temporarily blocked when dry to prevent fish access. Channel barriers such as a steel plate, constructed timber barrier or gravel berm can be used. These barriers should only be erected when the ditch is dry and may only remain in place until the works are completed, but must be removed no later than November 1st. Works can then be done using the "dry ditch" process and in accordance with the conditions in Step 6. The advantage of this methodology is that it eliminates the requirement for completing fish salvage in constructed ditches where there is seasonal fish access.

Figure 3 Agricultural Constructed Ditch Maintenance Process


Constructed Ditch
Dry Ditch No Contact
Wet Ditch
Follow Conditions in Steps 6 and 7 of this Guide
Work in Timing Window Table 3
Work Outside Timing Window Table 3
See Table 2 for Contact Requirements
Protocol Agreement
No Protocol Agreement
Follow Conditions in Steps 6 and 7 of this Guide
Follow Protocol Requirements
DFO must be Contacted
Follow Conditions in Protocol or Outlined in Step 6
Dry ditches can be maintained at any time but Step 6 of document must be followed.
Wet ditch maintenance must refer to the process above; check Table 2 for contact requirements and follow Steps 6 and 7 of this Guide.

All works should be undertaken during favourable weather and be completed as quickly as possible following the conditions and guidelines shown in Steps 6 and 7 of this document. If a storm should occur while maintenance work is being done, the "wet ditch" criteria should be followed. No silt or sediments is to migrate downstream into fish-bearing waters, whether during or after completion of the maintenance works.

Wet Ditch Maintenance

Depending on the scope and type of work proposed, wet ditches may require no contact, submission of a Ditch Maintenance Form or submission of a detailed description of the proposed works to DFO (i.e., to determine if an authorization needs to be issued). Refer to Table 2 for the contact method required for your proposed works if your watercourse is a wet constructed ditch. **Where it is indicated in Table 2 that a DFO authorization may be required, or if the proposed works are not listed in Table 2, contact DFO. See Appendix C.**

When works will be conducted during the Timing Window, Table 2 should be used to determine what contact, if any, is required for maintenance works in wet constructed ditches. *For works that list "DMF" as the contact method in Table 2, the Ditch Maintenance Form in Appendix B must be received (via hand delivery, fax or mail) at the appropriate DFO office a minimum of 14 working days prior to undertaking the works.* See Appendix C for a list of DFO offices.

Where works may require an authorization, a detailed description of the proposed works should be submitted to the appropriate DFO office well in advance of the Timing Window (i.e., prior to May 1st is recommended). For a description of what information should be submitted for works that may require an authorization refer to Step 3 DFO Authorization. Where works are identified as not requiring contact or if the submission of a DMF is required the conditions and guidelines in Steps 6 and 7 of this document must still be followed.

For works that may occur outside the timing window, works must be covered by a protocol agreement or an authorization obtained from DFO. Works approved by a licence under the *Water Act* such as the maintenance of pump intakes, screens and trash racks are not subject to the procedures outlined in Table 2. See item 7 under Step 7.

A protocol agreement that has been established with MELP and/or DFO will supercede the timing windows, guidelines, and contact requirements for constructed ditches as outlined here.

Construction of New Ditches

Producers may construct new ditches on their property that discharge into existing constructed ditches without contacting agencies. MELP and DFO must be notified for new ditches that discharge directly into a natural or channelized stream as the outlet is considered works in and about a stream. Proper sediment control is required in all situations.

Beaver Dam Management

New Beaver dams on a constructed ditch may be removed by a landowner as required. However if the Beaver have been established for a few years and a wetland has developed removal of the dam will required notification to MELP. See Appendix C "Beaver Dam Management" for guidance in the Lower Mainland.

Fish Salvage

Maintenance works on wet constructed ditches that have fish present will require fish salvage. A fish salvage permit must be obtained from DFO only, as MELP does not review works in these watercourses.

Weed Control

Mowing of vegetation along the constructed ditch banks and slopes above the waterline to control thistle, tansy ragwort and other obnoxious weeds can be done at any time of year without contact or authorization. (See Schedule A of the Weed Control Act). The preferable time of year is during the non-growing season or early winter. This time period is preferred as this will allow longer grasses and other vegetation to grow along watercourses in the summer months, providing shade to keep water temperatures cooler, but still provide channel capacity in winter.

Contact the Ministry of Agriculture, Food and Fisheries for appropriate weed control methods within 10 m of the top of bank of a constructed ditch or other watercourses.

Table 2 **Contact Requirements for Maintenance Work in a Wet Constructed Ditch**
Work is done during the Timing Window (Step 5)

Activity	Description DMF = Ditch Maintenance Form (Appendix B)	No Agency Contact	DMF	DFO Authorizatio
Vegetation Removal Step 6 - Item 1	Localized pruning of riparian vegetation, which is overhanging into the wetted channel and obstructing water flow, to a point above the high water mark and/ or pruning of ditch bank vegetation to a height of not less than 4 meters.	< 100m X	> 100m X	
	Hand *cutting* or machine mowing of emergent aquatic vegetation above the waterline of the ditch. (1 to 100 m of channel total per year per ditch)	< 100m X	> 100m X	
	Hand *removal* of emergent aquatic vegetation from the thalweg (i.e. emergent aquatic vegetation along the edges of the ditch is not disturbed) (1 - 100 m of channel total per year per ditch)	< 100m X	> 100m X	
	Machine mowing of vegetation in the ditch bottom below the waterline			X
	Machine removal of riparian vegetation on the north and east side of a constructed ditch (wet or dry) only for the purpose of constructing an access for channel maintenance		X	
	Machine removal of riparian vegetation on the south and west side of a constructed ditch (wet or dry).			X
	Any large scale removal of riparian vegetation on constructed ditches (i.e. removal of trees and riparian vegetation beyond which is outlined in the conditions above).			X
Sediment Traps / Bail Hole Step 6 – Item 2	Installation, maintenance or cleanout of sediment traps which do not require the construction of any structures within the ditch (e.g. weirs, dams, trash racks, etc.)		X	
Ditch Maintenance Step 6 – Item 3	Localized removal of blockages to flow less than 5 meters in length (e.g. debris dams)		X	
	Dredging or cleaning the entire bottom along a ditch length < 50 m / yr		X	
	Dredging or cleaning the entire bottom along a ditch length > 50 m /yr			X
	Constructed Ditch diversion or relocation			X
Bridge Installation or Repair Step 6 – Item 4	Construction of a clear span bridge over a constructed ditch for livestock or farm equipment where there is no loss of riparian vegetation and where no works will be undertaken below the top of bank.	X		
Culverts Step 6 – Item 5	Replacement of an access road culvert with a culvert of the same length.	X		
	Replacement of an access road culvert with a culvert of increased length.		X	
	New culvert installation that will not impact native trees and shrubs.		X	
Bank Stabilization Step 6 – Item 6	Bank stabilization by planting vegetation and seeding with a native grass mixture	X		
	Bank stabilization or repair by rip rap planted with vegetation, such as willows or other bio-engineered method (geo-fabric) if the area is less than 50 m^2.		X	
	Any bank stabilization works by bio-engineering greater than 50 m^2 or any 'hard' engineering works			X
Ditch Structures Step 7 – Item 7	Replacement of ditch structures, provided that the replacement structure is of the same size and function	X		
	Construction of a livestock watering area	X		
	Construction of a livestock crossing through a constructed ditch		X	
	Construction of new structures within the ditch e.g. irrigation gates		X	

*For constructed ditches proponents need to only contact DFO, as MELP does not review works in these watercourses. In all regions direct contact with DFO must therefore be made.

Step 5 Timing Window

An instream work timing window (Timing Window) is a time when salmonids and other fish species are at a stage in their life cycle when they are least sensitive to disturbances. Watercourse maintenance works should be planned to coincide with the appropriate Timing Window. Timing Windows shown in Table 3 can vary from region to region as well as between watersheds within a region. Provided the guidelines are followed, these windows are the most appropriate time of year for undertaking works that have the potential to impact fish. For additional information on timing windows contact MELP or DFO. See Appendix C.

General Timing Windows for constructed ditches and streams are shown in Table 3.

Table 3 Timing Window for Lower Mainland and Vancouver Island

Watercourse Type	Watercourse Condition	Timing Window	
		Lower Mainland	Vancouver Island
Constructed Ditch	Dry ditch	Any time of year while dry	Any time of year while dry
	Ditch has been blocked in summer to prevent fish from entering channel. See section 4.2 dry ditch maintenance	Prior to November 1st	Prior to November 1st
	Wet	June 15th – September 30th	June 15th – September 30th
Streams (Channelized or natural)		August 1st – September 15th	July 1st – September 15th

Extensions

If works cannot be conducted during the specified Timing Window, an extension to the Timing Window may be granted by DFO. Extensions will be considered on the basis of weather conditions, habitat type or function and fish use, including migration timing of adult salmonids.

Timing Windows for Constructed Ditches

A constructed ditch can be cleaned at any time if it does not contain water (i.e., when it is a "dry ditch"). If a ditch has been temporarily blocked while dry to prevent fish access, and remains blocked until maintenance works are completed, the ditch may be treated as a dry ditch until November 1st when the fish barrier must be removed. Wet ditches must follow the Timing Windows shown in Table 3.

Refer to Table 2 for the contact requirements for works in a wet constructed ditch. All works must be conducted in accordance with the conditions in Step 6.

Timing Windows for Streams

For streams the Habitat Officer or Habitat Biologist establishes the timing window. The stream timing windows provided in Table 3 are to be used for work under the Part 7 regulation or as a guide to when the best time for conducting works in a stream is expected to be. The Timing Windows for Vancouver Island and the Lower Mainland differ due to timing of fish life cycles and the fish species present in the stream systems.

Prior to any work on a "stream" notification or approval is likely required under Part 7, Section 9 of the "Working in and About a Stream Regulation" of the B.C. *Water Act* and an authorization from DFO may be required under the federal *Fisheries Act*.

PROTOCOL AGREEMENTS

Protocol Agreements established between the municipalities and the environmental agencies may permit area-specific drainage and maintenance works outside of the regular Timing Windows.

In the Lower Mainland, producers located within a municipality that have a Protocol Agreement for watercourse maintenance, may have the agreement extended to their on farm drainage maintenance work. The municipality must agree to incur the responsibility for ensuring that works are carried out in accordance with the Protocol Agreement. Contact your local municipality to determine if they have a Protocol Agreement which allows for on farm works outside the general Timing Windows, and to determine when municipal drainage maintenance works are scheduled for your area.

If a protocol agreement has not been established with the municipality and work must be done on a wet ditch outside the Timing Window, an application must be made to DFO by the proponent.

Step 6 Conditions Specified for Maintenance of Constructed Ditches

This section provides conditions for works in constructed ditches that are shown in Table 2 as requiring the submission of a Ditch Maintenance Form (DMF) to DFO or "no agency contact". It is important that these works are conducted during the appropriate timing window (refer to Step 5) and in accordance with the conditions provided in this section for the specific activity.

The following conditions are provided to prevent and mitigate impacts to fish and fish habitat. To decrease the chance of contravening the *Fisheries Act*, these conditions must be adhered to when conducting works in and about a constructed ditch. The onus is on the person responsible for undertaking the works to assess their situation and ensure that they are in compliance with the provisions of all relevant legislation.

Conditions are provided for the following activities:

1. Vegetation Removal on Constructed Ditches
2. Sediment Trap/Bail Hole Clean Out in Constructed Ditches
3. Constructed Ditch Maintenance
4. Clear Span Bridge Installation and/or Repairs over a Constructed Ditch
5. Culvert Replacement or Extension on a Constructed Ditch
6. Bank Stabilization on Constructed Ditches
7. Construction and Replacement of In Ditch Structures

Certain conditions make reference to the guidelines in Step 7, which contain additional information.

If your proposed works in a constructed ditch required a DFO authorization, you must submit an application to DFO and then proceed as directed. (Refer to Table 2 to determine regulatory requirements). **The following conditions DO NOT provide guidance for conducting activities that require an authorization.**

Note: Maintenance works to instream structures that are licenced under the Water Act may be done without contact to MELP or DFO. Maintenance works must be done in a manner that does not impact fish or fish habitat.

1. Vegetation Removal on Constructed Ditches

Mowing of vegetation along constructed ditch banks above the waterline to control blackberries, thistle, tansy ragwort or other noxious weeds can be completed at any time of year without contacting MELP or DFO.

If the constructed drainage ditch dries each summer but is wet during winter, then it should be mowed when dry to avoid the need to do a "wet" clean out during winter.

For constructed ditches that are wet year-round, the preferred time of year for mowing vegetation growth (excluding shrubs and/or trees) adjacent to constructed ditches is in winter when water levels are low. Mowing during fall/ winter allows for riparian vegetation to green up along the ditch during the summer months, providing shade to help keep water temperatures cool and to provide protective cover for juvenile salmonids.

- Mowing does not include the removal of shrubs and/or trees.
- All grass cuttings or fallen debris should be cleared from the ditch to prevent flow blockages.

Vegetation Maintenance on Constructed Ditches

- Hand cutting and/ or hand removal of instream or riparian vegetation is the preferred method for vegetation maintenance. Hand maintenance is area specific and enables selective clearing where necessary instead of whole scale cutting or removal of vegetation.
- Pruning of vegetation should be undertaken during the fall or winter months so that vegetation shades the water during summer to help keep water temperatures cool.
- All grass cuttings or fallen debris from hand-cutting or pruning should be cleared from the ditch to prevent flow blockages.
- Removal of riparian vegetation (e.g., shrubs) to create openings for access and/ or sight lines for channel maintenance activities should only be undertaken on one side of the channel (preferably the north or east sides). Removal of vegetation should be minimized (See Agriculture Stewardship Guide).
- If clearing and grubbing activity is undertaken in or about the ditch, the work must be conducted and completed in such a manner as to prevent the release of silt, sediment or sediment-laden water, or other deleterious substances from entering the ditch.

2. Sediment Trap/Bail Hole Clean Out in Constructed Ditches

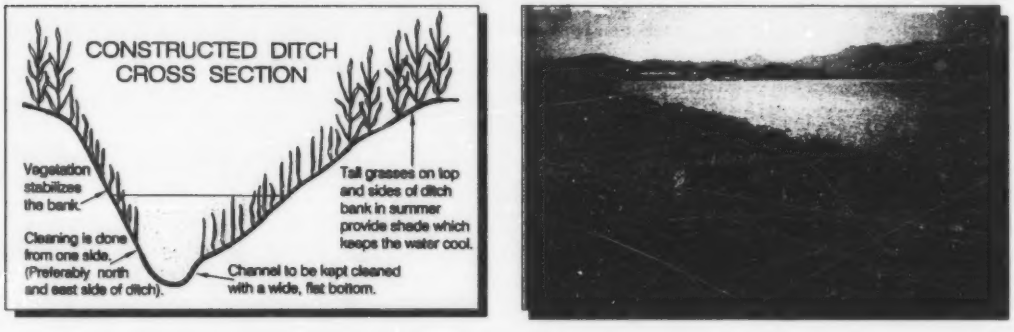
- All works must be undertaken during the Timing Window for your area (refer to Step 5).
- All works must be conducted during favourable weather and low water conditions.
- If the constructed ditch has fish present, a fish and amphibian salvage must be undertaken by persons who have been trained to complete this type of work. Fish collection permits must be obtained from DFO prior to the commencement of the works (See Step 7 item 1).
- Works must be conducted in isolation of flowing water. (See Step 7 item 5)
- Work must be undertaken in a manner as to prevent the release of silt, sediment or sediment-laden water or any other deleterious substance **downstream** (refer to Step 7, Item 2).
- Machinery is to work from the top of bank and not from within the ditch.
- There should be no disturbance to riparian vegetation. Further, to minimize disturbance to vegetation located at the top of bank, works should be conducted from one side of the ditch only (preferably the north or east side).
- Dredged materials should be trucked off site or placed above the top of bank a minimum of 1 metre back from the top of bank in such a way that its re-entry into the ditch is prevented.
- It is recommended that the works be commenced at the upstream end of the ditch and progress downstream.

3. Constructed Ditch Maintenance

Dry Constructed Ditch Cleaning

- Works in a dry constructed ditch may be undertaken at any time of the year.
- All works must be conducted during favourable weather.
- Sediment control measures should be implemented to ensure that there is no release of silt, sediment or sediment-laden water, or any other deleterious substance to **downstream** areas during a rainstorm event (for further details refer to Step 7 item 2).
- Do not over-excavate the constructed ditch. Attempt to maintain side slopes at 2:1 (horizontal: vertical) and slope the bottom invert to one side or as a slight "V" such that a low-flow channel provides effective drainage at low water levels, while also maintaining a low-flow channel for fish once water levels rise.
- There should be no disturbance to riparian vegetation (i.e., trees and shrubs). Further, to minimize disturbance to vegetation located at the top of bank, works should be conducted from one side of the ditch only (preferably the north and/or east side).
- If isolation has been used to qualify the ditch as a "dry ditch" the removal of the blockage should be undertaken once the water has cleared and with caution to prevent the release of silt, sediment or sediment-laden water or any other deleterious substance **downstream**.
- Re-release of water into the cleaned ditch channel should be conducted to allow for a gradual release. Removal of sediment control devices should be undertaken once the water has cleared.

Figure 4 Good Ditch Condition


CONSTRUCTED DITCH
CROSS SECTION
Vegetation stabilizes the bank.
Cleaning is done from one side. (Preferably north and east side of ditch).
Channel to be kept cleaned with a wide, flat bottom.
Tall grasses on top and sides of ditch bank in summer provide shade which keeps the water cool.

Wet Constructed Ditch Cleaning

- All works must be undertaken during the Timing Window for your area
- All works must be conducted during favourable weather and low water conditions.
- If the constructed ditch has fish present, a fish and amphibian salvage must be undertaken by persons who have been trained to complete this type of work. Fish collection permits must be obtained from DFO prior to the commencement of the works (for further details refer Step 7 item 1).

- Works must be conducted in isolation of flowing water. (See Step 7 item 5)
- Work must be undertaken in a manner as to prevent the release of silt, sediment or sediment-laden water or any other deleterious substance **downstream** (for further details refer to Step 7 item 2).
- Re-release of water into the cleaned ditch channel should be conducted gradually. Removal of sediment control devices should be undertaken once the water has cleared.
- Machinery is to work from the top of bank and not from within the ditch. Whenever possible machinery should work from the north and/or east side of the constructed ditch.
- There should be no disturbance to riparian vegetation. Further, to minimize disturbance to vegetation located at the top of bank, works should be conducted from one side of the ditch only.
- Where large riparian vegetation (e.g., shrubs) exists, selective clearing for sightlines or
- access may be undertaken on one side of the channel (preferably the north or east sides).
- Dredged materials should be trucked off site or placed above the top of bank a minimum of 1 metre from the top of bank in such a way that its re-entry into the ditch is prevented.
- Do not over-excavate the constructed ditch. Maintain side slopes at 2:1 (horizontal: vertical) and slope the bottom invert to one side or as a slight "V" such that a low-flow channel provides effective drainage at low water levels, while also maintaining a low-flow channel for fish.
- Minor deepening of the constructed ditch may be undertaken for the purpose of establishing a small sedimentation trap. This may be undertaken within 5 metres upstream or downstream of a culvert only in locations where the culvert is set below the stream invert elevation (i.e., the culvert is not perched). Deepening of the bottom invert should not exceed 0.1 meter of the established invert of the ditch.
- Works should commence at the upstream end of the ditch and progress downstream.
- If the constructed ditch is wide (i.e., greater than 1 metre wide at the channel bottom), grass and sediment should be removed from the centre line of the channel leaving edge grasses in place **to maintain ecosystem health** and habitat function for fish.

4. Clear Span Bridge Installation and/or Repairs over a Constructed Ditch

- All construction and/ or repair work must be undertaken during favourable weather conditions.
- For new installations, the bridge must be clear span (i.e., the bridge deck and footings must be completely above the high water mark).
- All work must be conducted and completed in such a manner as to prevent the release of silt, sediment or sediment-laden water, raw concrete or concrete leachate, construction wastes or any other deleterious substances into the ditch.

- No concrete works may be undertaken within the wetted perimeter of the ditch. (See concrete information below)
- All equipment and machinery must be free of leaks or excess oil and grease. Equipment re-fuelling or servicing or storage of fuel must be undertaken a minimum of 15 meters from the ditch.
- Any disturbed areas at the top of bank should be re-graded and stabilized by seeding or re-vegetating with *native* riparian vegetation upon completion of the work to prevent surface erosion and/ or siltation of the constructed ditch (see riparian planting guidelines step 7 – item 8).
- Vegetation in and/ or adjacent to the ditch is to be disturbed as little as possible.
- For bridge maintenance activities pertaining to sand-blasting, abrasion or painting, contact DFO to obtain a copy of the "Bridge Maintenance Guidelines".

Concrete

If any concrete, cast-in-place concrete, or grouting works are to be undertaken, there is high potential for concrete and/ or concrete leachate to enter a watercourse. Concrete, concrete leachate, grout and other uncured concrete substances (e.g. concrete bags for headwall construction) are deleterious and highly toxic to fish and other aquatic organisms. To perform any concrete-related works all water must be completely isolated prior to the commencement of any instream works (refer to Step 7, Item 5). In addition, measures must be taken to prevent the incidence of concrete from entering a watercourse, ravine or storm sewer system for a minimum of 72 hours after the works have been completed to ensure that the concrete has fully cured. Where concrete works are proposed the "Ditch Maintenance Form (DMF)" should be completed and sent to DFO, or if further advice is required contact DFO.

5. Culvert Replacement or Extension on a Constructed Ditch

DFO may notify proponents of additional requirements after reviewing the Ditch Maintenance Form that needs to be submitted prior to initiating some works.

- All works must be undertaken during the Timing Window for your area.
- All works must be conducted during favourable weather and low water conditions.
- If the constructed ditch has fish present, a fish and amphibian salvage must be undertaken by persons who have been trained to complete this type of work. Fish collection permits must be obtained from DFO prior to the commencement of the works (for further details refer Step 7 item 1).
- Works must be conducted in isolation of flowing water. (See Step 7 item 5)
- Work must be undertaken in a manner as to prevent the release of silt, sediment or sediment-laden water, raw concrete or concrete leachate, or any other deleterious substance **downstream**. (See concrete clause in step 6 item 4 above and refer to Step 7, Item 2).
- Re-release of water into the channel and/or culvert should be done gradually. Removal of sediment control devices should be undertaken once the sediments have settled out of the water and the water has cleared.
- Machinery is to work from the top of bank and not from within the ditch.
- Minor deepening of the constructed ditch may be undertaken within 5 metres upstream or downstream of a culvert only in locations where the culvert is set below the ditch invert elevation (i.e., the culvert is not perched).

- All excavated material and debris must be removed from the site or placed in a stable area above the high water mark of the ditch and protected from surface erosion by seeding or planting.
- Any material such as riprap, placed within the average high water mark of the ditch must be free of silt, overburden, debris or other substances deleterious to aquatic life. Rock used as riprap must be durable, angular in shape and suitably graded and sized to resist movement by stream flow.
- Any disturbed areas at the top of bank should be re-graded and stabilized by seeding or re-vegetating with *native* riparian vegetation upon completion of the work to prevent surface erosion and/ or siltation of the constructed ditch (see riparian planting guidelines Step 7 item 6).
- All newly installed (including replacement) culverts should be oversized and installed approximately 30 cm below the stream bottom invert.
- New culvert headwalls (including replacement headwalls) should be constructed of wood, riprap or pre-cast concrete structures. For cast-in-place or concrete bag headwalls, a Ditch Maintenance Form must be forwarded to DFO. Additional requirements for their installation may be required. (See concrete clause in Step 6 item 4 above)
- If the constructed ditch has fish present, and the culvert gradient is greater than 0.5%, baffles will be required to facilitate fish passage to upstream areas. In such situations, a detailed description of the proposed works should be submitted to DFO, as additional requirements for their installation may be required.
- An outlet pool with tailwater control should be provided at the culvert exit.

6. Bank Stabilization on Constructed Ditches

- Bank stabilization using "soft" engineering techniques (i.e., planting and/ or seeding) may be undertaken at any time of year without notification or approval (for more information on planting refer to Step 7 item 3).
- Bank stabilization using any form of "hard" engineering technique (i.e., bio-engineering or riprap placement) must be undertaken during the Timing Window for your area. DFO authorization may be required if the ditch has fish habitat.
- All works must be conducted during favourable weather and low water conditions.
- If the constructed ditch has fish present, a fish and amphibian salvage must be undertaken by persons who have been trained to complete this type of work. Fish collection permits must be obtained from DFO prior to the commencement of the works (for further details see Step 7 item 1).
- Works must be conducted in isolation of flowing water. (See Step 7 item 3)
- Work must be undertaken in a manner as to prevent the release of silt, sediment or sediment-laden water, raw concrete or concrete leachate, or any other deleterious substance **downstream** (for further details see Step 7 item 2).
- Re-release of water into the channel and/or culvert should be conducted to allow for a gradual release. Removal of sediment control devices should be undertaken once the sediments have settled out of the water and the water has cleared.
- Machinery is to work from the top of bank and not from within the ditch.

- Riprap should be hand-placed or machine-placed individually. Riprap should be placed at the toe of the slope and may extend up to the average high water mark as necessary.
- Any material such as riprap, placed within the average high water mark of the ditch, must be free of silt, debris or other substances deleterious to aquatic life. Rock used as riprap must be durable, and suitably graded and sized to resist movement.

7. Construction and/or Replacement of In Ditch Structures

- Work must be undertaken in a manner as to prevent the release of silt, sediment or sediment-laden water or any other deleterious substance **downstream** (See Step 7 item 2).
- All excavated material and debris must be removed from the site, or placed in a stable area above the high water mark of the stream as far as possible from the channel, and protected from erosion by planting. Material, which is moved off site must be disposed of in such a manner as to prevent its entry into any watercourse, floodplain, ravine, or storm sewer.
- All work must be undertaken and completed in such a manner as to prevent the release of substances, which are deleterious to aquatic life into any ditch, watercourse, ravine or storm sewer system.
- Machinery is to work from the ditch bank and not in the ditch channel.
- All machinery used on the site must be in good repair and be free of excess oil and grease. All hydraulic machinery to be used in the ditch must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic to aquatic life, and which are readily inherently biodegradable.
- A spill containment kit must be readily accessible on-site in the event of a release of a deleterious substance to the environment. Any spill of a deleterious substance into any watercourse must be immediately reported to the Provincial Emergency Program (24 hour phone line: 1 800 663 3456).
- Refueling of the machinery is to be conducted a minimum of 15 metres away from any watercourse, drainage channel and/or stormwater system catch basin.
- Care must be taken not to disturb ditchside vegetation.
- All work is to be done in the dry or at low water levels to mitigate the release of sediment into watercourses downstream of the work site.
- A qualified fisheries biologist must be retained to determine fish presence in all of the watercourses where in water works will be undertaken, and where fish are present, undertake a fish salvage prior to the commencement of the works. The biologist must contact DFO prior to undertaking the sampling and salvage, and must obtain all the necessary permits required by fisheries regulations. If in the course of conducting works the operator observes or becomes aware of the presence of any fish, works must be immediately ceased, and a salvage undertaken.
- It is understood that by proceeding with the subject works the proponent and their agent(s) and/or contractor(s) understand and agree to the foregoing terms and conditions.

Step 7 Guidelines on How to Conduct Works in Constructed Ditches

The following guidelines are provided for work done in constructed ditches where an approval or authorization is not required.

1. Fish Salvaging for Constructed Ditches

Prior to undertaking instream works (e.g. dredging) within a wet constructed ditch that has fish present, a fish salvage must be completed. Fish salvaging is a process used to temporarily remove and relocate fish from a given section of stream channel where work is to be done. Removal is required to ensure that fish utilizing a specific section of channel are not injured or killed when work is done.

The process involves isolating short sections (<30 m) of a channel with either a fine seine net or other impenetrable barrier (e.g. coffer dam, plywood sheet). Once isolated, the fish within the isolated channel are then removed with the use of seine nets, pole seines, fry (minnow traps) or highly specialized backpack electro-shocking devices (small portable units which temporarily stun fish). The fish are then relocated either upstream or downstream of the isolated section.

When the fish salvage is completed, sediment control measures are installed in the isolated section of the channel. Works can then be done with no impacts to residing fish or downstream water quality. After instream works have been completed and turbidity has disappeared in the isolated section of channel, the sediment control measures and fish barriers can be removed, allowing fish access.

In addition to fish species, it is recommended that other aquatic species including amphibians be removed. As fish salvages require the use of specialized equipment, it should be undertaken by suitably trained personnel with knowledge of safety standards and an understanding of the proper methods for handling fish. Due to the inherent risk to both the operator and fish, backpack electro-shocking must only be undertaken by persons who have been trained and certified in backpack electro-shocking procedures.

Fish salvage/collection permits are required. Contact DFO for further information on obtaining fish salvaging permits. The following information should be included when applying for a fish salvage permit:

- Watercourse name: if one doesn't exist include a geographic location (i.e. unnamed tributary flowing from the northwest to the Englishman River)
- Sampling method (dip nets, minnow trapping etc.)
- Date sampling will occur
- Fish species to be captured
- Name of applicant, phone, fax, address, person conducting fish salvage

Permits take two weeks to process.

A simple method to determine salmonid presence is to monitor water temperature and/or dissolved oxygen concentrations. Salmonid fish species are unlikely to be present if water temperatures exceed 25°C or if the dissolved oxygen is below 1.0 mg/L.

2. Sediment and Erosion Controls for Constructed Ditches

During all maintenance works, measures must be taken to prevent sediment movement into a watercourse, or downstream if instream works (such as a wet clean out or culvert installation) are being undertaken. These measures should be in place both during and after the works. Sediment and erosion controls are a critical necessity to ensure protection of fish and other aquatic species. At high concentrations (greater than 25 mg/L above natural background levels) sediment may be considered a *deleterious* substance, as defined by Section 34 of the *Fisheries Act*. Under Section 36(3) of the Fisheries Act it is unlawful to deposit, release, discharge or permit the deposit of a deleterious substance into fish-bearing waters.

Sediment in a watercourse can disrupt many of the life processes of fish and other aquatic life (e.g. insects and plants). Sediment can cause irreparable injuries or even death to fish and aquatic life. Sediment can also lead to additional wear on mechanical equipment and other machinery, and can cause the plugging of irrigation screens.

If the work is expected to result in any sediment loading to a watercourse, it may be necessary to divert or pump water around the work site so that works are conducted in isolation of water flow.

There are many widely-used methods for sediment and erosion control. The following examples provide guidance for sediment and erosion control but are not the only acceptable methods available.

Erosion controls:

The best erosion control mechanism available is plant life. Where exposed earth or large tracks of topsoil or sediment is adjacent to a stream, the best method for controlling erosion from the sides of the banks is to seed them as soon as possible. In addition, any works which may result in exposed earth should be undertaken during dry periods.

Other erosion control mechanisms include:

- Spreading straw or hay over exposed soils such that the straw absorbs any rainfall and helps prevent sediment, soils or other from washing into a watercourse;
- Coco-matting placement over the exposed area. This is normally done where the banks are fairly steep, or if it is late in the season such that seed is unable to take.

Sediment controls:

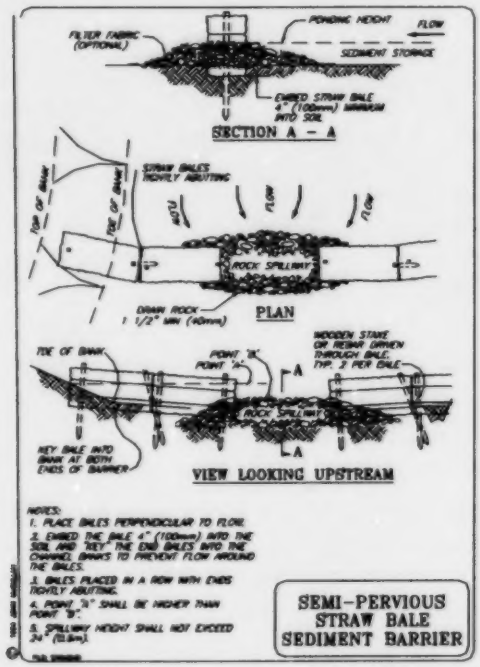
Block ditch outlet with a piece of plywood or leave a plug of material from the channel. These can be removed when the work is done and the water is clear.

A semi-pervious straw bale sediment barrier works well for short duration works where there is little flowing water. The advantage of this method of sediment control is that it is easy to install and it is a relatively inexpensive method for sediment control. However, bales can easily "silt up", thus decreasing their effectiveness. When this occurs, the bales require changing (usually daily). Another disadvantage is that, when saturated, the straw bales can break apart thus releasing all the trapped sediments downstream. Care should be taken when removing the straw bales such that the bales are removed whole.

Construction of Sediment Traps

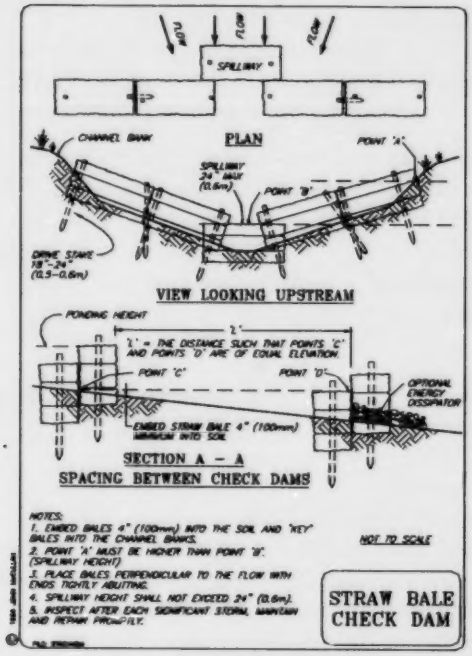
Sediment or silt traps may be installed in strategic locations to minimize the need for full-scale clean outs of watercourses. Sediment traps should be installed where accumulations of sediment consistently occur, such as the point where two drainages meet, or a significant break in slope where sediments drop out of the water column and accumulate.

Figure 5 Semipervious Straw Bale Check Dam



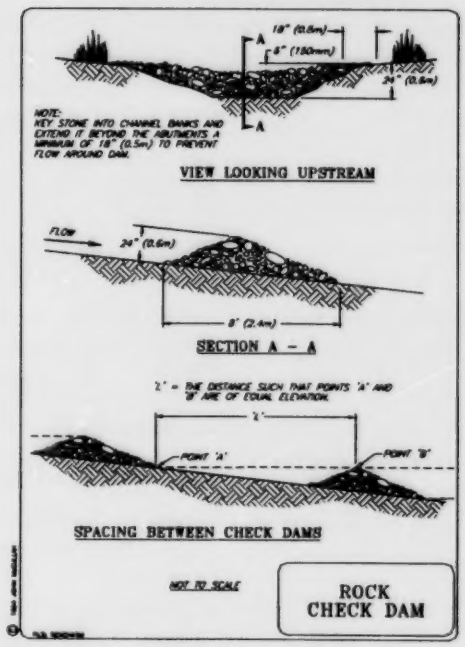
Check dams work well where there are works that are longer term or where there is some flowing water, but not more than a cubic meter unless the check dams are appropriately engineered by professionals. If you are dealing with large water volumes it is advisable to contact DFO for assistance or advice. Check dams are meant to provide a small barrier to flow, behind which water is temporarily ponded (referred to as impounded). Where water is impounded, sediments drop out of the water column and accumulate behind the dam. There should be several structures in place, enough to ensure that the water decanting over the last check dam is clean. These structures require maintenance. Accumulated sediments may need to be removed periodically to ensure that the check dam is functioning as intended.

Figure 6 Hay Bale Check Dam


SPILLWAY
PLAN
CHANNEL BANK
POINT 'A'
POINT 'B'
DRIVE STAKE 18"–24" (0.5–0.6m)
VIEW LOOKING UPSTREAM
PONDING HEIGHT
'L' = THE DISTANCE SUCH THAT POINTS 'C' AND POINTS 'D' ARE OF EQUAL ELEVATION.
POINT 'C'
POINT 'D'
OPTIONAL ENERGY DISSIPATOR
EMBED STRAW BALE 4" (100mm) MINIMUM INTO SOIL
SECTION A – A
SPACING BETWEEN CHECK DAMS
NOTES:
1. EMBED BALES 4" (100mm) INTO THE SOIL AND "KEY" BALES INTO THE CHANNEL BANKS.
2. POINT 'A' MUST BE HIGHER THAN POINT 'B'. (SPILLWAY HEIGHT)
3. PLACE BALES PERPENDICULAR TO THE FLOW WITH ENDS TIGHTLY ABUTTING.
4. SPILLWAY HEIGHT SHALL NOT EXCEED 24" (0.6m).
5. INSPECT AFTER EACH SIGNIFICANT STORM, MAINTAIN AND REPAIR PROMPTLY.
NOT TO SCALE
STRAW BALE CHECK DAM

Rock used in check dams must be of 100 mm clean gravel. No angular and/or crushed drain rock is to be used.

Figure 7 Rock Check Dam


18" (0.6m)
6" (150mm)
24" (0.6m)
NOTE:
KEY STONE INTO CHANNEL BANKS AND EXTEND IT BEYOND THE ABUTMENTS A MINIMUM OF 18" (0.5m) TO PREVENT FLOW AROUND DAM.
VIEW LOOKING UPSTREAM
FLOW
24" (0.6m)
8' (2.4m)
SECTION A – A
'L' = THE DISTANCE SUCH THAT POINTS 'A' AND 'B' ARE OF EQUAL ELEVATION.
POINT 'A'
POINT 'B'
SPACING BETWEEN CHECK DAMS
NOT TO SCALE
ROCK CHECK DAM

Rock used in check dams must be of 100 mm clean gravel. No angular and/or crushed drain rock is to be used.

3. Bank Stabilization for Constructed Ditches

It is essential to maintain ditches using practices that ensure the banks remain stable and do not slough in over time. In low gradient ditches the soil structure is the most important aspect of the stability. Sands, peat, and loose loam ditches often have bank wall failures. It is important to ensure that the banks of a ditch are sloped between 2:1 to 4:1 horizontal to vertical ratio. Gently sloped banks will help to maintain bank stability and will prevent slumping and infilling of the ditch due to erosion. It is also important to ensure that ditches are not over-excavated thereby de-stabilizing existing slopes, which would increase slope failures to cause infilling of the cleaned out ditch.

Use caution with stabilization methods if future cleaning is to take place. Bank stabilization works greater than 50 m2 will require approval from DFO. These guidelines are meant for small ditch bank stabilization techniques only and are not intended to provide advice for slopes requiring engineered techniques for stabilization. If slope failure is extensive or the following methods for bank stabilization are not applicable to the situation such that an engineered solution is necessary (i.e. slope re-design), contact DFO for advice.

Streamside Planting

The planting of cuttings or seedlings along the banks and adjacent to a ditch can significantly reduce the erosive capability of water flow and can stabilize streambanks in a natural way. Where streamside vegetation is lacking, vegetative reclamation of the streambank is often the most effective method for ensuring stabilization. There are many benefits to overall watershed health due to streamside vegetation, including

the production of food and nutrients, water quality, flood reduction, water temperature regulation to name a few. Plant roots help to "firm up" the streambank and streamside grasses and plants both slow water velocities as well as provide a buffer for the streambank against erosion. A disadvantage is that some weedy species can also grow in these areas and would require selective maintenance for their removal.

Streamside planting is a relatively inexpensive method for streamside bank stabilization. Cuttings of willow, salmonberry and other species are often readily available and easy to install. The planting of these cuttings is referred to as "live-staking". There are several streamkeepers groups that may be able to offer expertise or assistance in sourcing materials or in labour. Contact your local municipality or DFO's Community Advisors for more information in this regard (give contact numbers).

Information from MELP is available on recommended Native Tree and Shrub species for the Restoration and Enhancement of Fish Habitat.

Streamside Fencing

Streamside fencing can help to stabilize the banks of a ditch, particularly in areas where cattle have unrestricted access to a ditch for grazing. The construction of fences adjacent to a ditch helps to protect the stream banks, natural vegetation as well as the stream itself. By restricting livestock access to a stream, vegetation will re-establish along the stream banks thereby limiting erosion. It also can improve downstream water quality by reducing inputs of sediment and other animal and agricultural wastes.

Provision of constructed livestock watering holes adjacent to the stream rather than in the stream itself helps to protect other stream resources, such as salmonids. Check with DFO or MELP for assistance with streamside fencing/ livestock watering hole projects.

Riprap Placement

Rock riprap is essentially the placement of angular rocks of various sizes such that the rocks "lock together" along the stream banks. The rocks help to stabilize the banks by providing a hard layer of protection outside of the softer, easily erodable stream bank materials (e.g. sand or fine sediments). It works best where stream banks are less than 2:1 horizontal to vertical and where water velocities are less than 4.0 m/sec. Note however, that at velocities greater than 2.0 m/sec, other installation methods may be necessary. In such instances DFO should be contacted.

The advantage of riprap is that it remains stable at most flow levels, it is durable, easy to install and easy to maintain. However, large projects can be costly, it restricts natural channel movement, it looks unnatural and can cause other erosion problems upstream and downstream of where it is placed

Riprap pieces should be placed at the toe of slope to just above the eroded areas. It is advisable to obtain expertise to ensure works will be stable and functional. The following is a brief methodology for the installation of riprap on a constructed ditch:

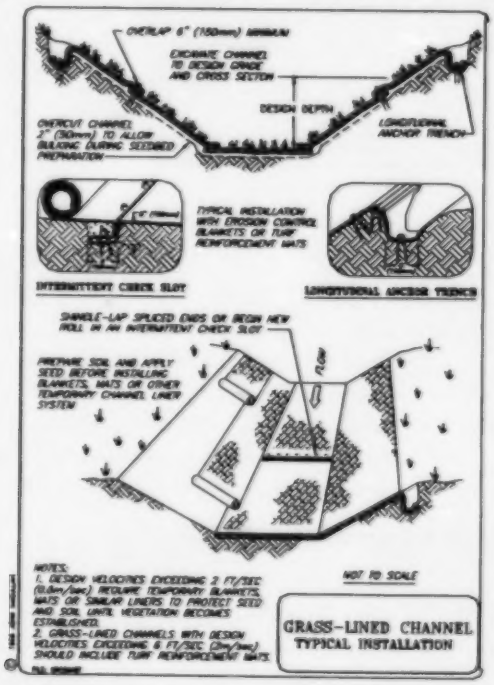
- Riprap should be hard, angular rock such as granite. Do not use broken concrete slabs as these can erode over time and the resultant fine material accumulations can be destructive to downstream fish habitat.
- Plan a side slope between 2:1 and 4:1 (horizontal to vertical distance ratio).
- Mechanically shape the wall as closely to this slope as possible.

- Dig a toe wedge of rock [rip rap] into the base line of the slope.
- Place larger pieces of riprap at the toe of slope and work upwards to the erosion line with smaller riprap materials. Ensure however, that riprap is of a size sufficient enough that it will not be transported downstream during flood events.
- Pack the shale or rip rap with the back of the excavator bucket.
- Cover the rock above the high water mark with topsoil or material excavated fom the ditch, once drained. Seed the topsoil with a fast-growing native grass seed mixture. Immediate seeding with native grasses will help to prevent recolonization of the area by weeds.
- Shrubs planted at the top of bank may also help to minimize the re-growth of noxious weeds and can significantly reduce the growth of instream grasses such that future maintenance is minimized.

Where water velocities are above 2 m/sec on a constructed ditch, it may be necessary to install erosion control blankets (e.g. filter cloth) or turf reinforcement mats to ensure stability. If water velocities are 2 m/sec or greater on a constructed ditch, contact DFO or MELP for further advice. In such cases, advice from an engineering consultant may also be necessary.

Figure 8 provides information on installation of riprap and filter blankets for the stablilization of channel banks.

Figure 8 Channel Stabilization with Filter Blanket


EXCAVATE CHANNEL TO DESIGN GRADE AND CROSS SECTION
DESIGN DEPTH
OVERCUT CHANNEL 2" (50mm) TO ALLOW BULKING DURING SEEDBED PREPARATION
LONGITUDINAL ANCHOR TRENCH
TYPICAL INSTALLATION WITH EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS
INTERMITTENT CHECK SLOT
LONGITUDINAL ANCHOR TRENCH
SHINGLE-LAP SPLICED ENDS OR BEGIN NEW ROLL IN AN INTERMITTENT CHECK SLOT
PREPARE SOIL AND APPLY SEED BEFORE INSTALLING BLANKETS, MATS OR OTHER TEMPORARY CHANNEL LINER SYSTEM
FLOW
NOTES:
1. DESIGN VELOCITIES EXCEEDING 2 FT/SEC (0.6m/sec), REQUIRE TEMPORARY BLANKETS, MATS OR SIMILAR LINERS TO PROTECT SEED AND SOIL UNTIL VEGETATION BECOMES ESTABLISHED.
2. GRASS-LINED CHANNELS WITH DESIGN VELOCITIES EXCEEDING 6 FT/SEC (2m/sec) SHOULD INCLUDE TURF REINFORCEMENT MATS.
NOT TO SCALE
GRASS-LINED CHANNEL
TYPICAL INSTALLATION

Bio-Engineering

Bioengineering is a method for bank stabilization that incorporates the use of riparian vegetation, often in conjunction with other stabilization methods, such as riprap. This method for stabilization is excellent because it ensures the long-term stability of streambank slopes.

Bio-engineering takes advantage of different kinds of planting schemes and methods. These may include: spiling and wattling, tree revetments, log cribs, construction of log bank cover, or planting in between riprap spaces and at the top of bank.

A brief description of each of these methods is offered below for infomation. These are most often applied to streams, rather than constructed ditches; however there may be some application for such methods, depending on the nature of the constructed ditch. For more information on these methods, or for further advice or information on material sourcing, please contact DFO or MELP. Qualified professionals may be required to assist in the construction of some of the following methods for bank stabilization.

Spiling and wattling:
Wattles are fairly long tree cuttings (usually willow) that are woven through spiles, which are anchor posts, and placed lengthwise along the banks. A "wall" of willow cuttings will take root, and grow upwards, stabilizing eroding banks. They are very effective for ditches having low to moderate stream flows, up to 5 m/sec.

Tree revetment:
Tree revetment involves the grading of a slope to 2:1 horizontal to vertical, then cabling into the bank slope durable green coniferous trees, such as cedar and pines. The branches of the trees are meant to dissipate water velocities and a streams energy. Sediment settles out behind the branches and can help to "rebuild" an eroded bank. They are most effective when used in locations where ditch banks are rapidly eroding.

Log cribs:
A log crib is basically a "live" log wall, built crib-style, to protect eroding banks. Vegetation is planted between the logs used to build the wall, as well as at its top to reduce stream velocities as well as to provide cover and shelter for fish.

Log Bank Cover
Log bank cover is like a shelf built into the streambank, which is covered with topsoil and native riparian grasses and vegetation. They are often referred to as "undercut bank" structures. They provide some bank protection benefits; however, they are most often built to provide complexity in ditches where there is fish presence and where there is little available cover or shelter for fish.

4. Ditch Cleaning Equipment and Operation

All supervisors, contractors, labourers and operators conducting works instream and using ditch cleaning equipment should have good knowledge of methods for sediment and erosion control, Protocol Agreements, the Agricultural Watercourse Maintenance Guide, as well as methods for minimizing risks to fish and fish habitat. Prior to undertaking any maintenance works these persons must understand and agree to follow the terms and conditions of the guideline documents.

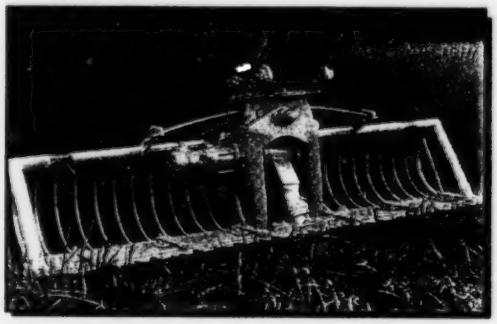
For removal of aquatic plants manually, hand rakes, grab forks, and sickle cutters may be used to remove materials from instream and from along the sides of banks.

Mechanical cleaning may be undertaken by a variety of methods, as follows:

- A mowing bucket has a mechanized sickle cutter bar and bucket which is used to mow grasses from the bottom of the ditch. Place cut grasses on the shoulder (crest) of the ditch or farther away to allow for decomposition or to facilitate their removal.
- An open slotted back bucket (or "dredging bucket") is used when the mowing bucket is uneconomical, due to rock or thickness of grass. Although impacts to fish and other aquatic species can occur, this type of bucket, when properly used, is more friendly than an excavator bucket as it can the return of some fish and aquatic invertebrates back to the ditch if they escape through the slots.
- An excavator clean up bucket is a close-backed scooping device which removes everything the excavator hauls out of the stream. The operator of the excavating machine should be trained to allow spillage of water from the bucket. It is suggested that a clean up bucket not be used for extensive maintenance (>100m) on a wet ditch.

For more information, refer to BCMAF's Agriculture Drainage Manual.

Figure 9 Ditch Mowing Equipment



5. Isolation of Water Flow

Isolation of water flow may be undertaken using several different methods. The method chosen should be appropriate for the amount of flowing water in the ditch. Several accepted methods for water flow isolation are described below:

- Use of irrigation gates
- Use of gravel or earthen plug
- Use of sheet metal
- Use of rock weir
- Use of culvert
- Use of temporary diversion channel

6. Riparian Leave Areas

Establishing a healthy riparian areas improves agriculture and fish resources. A healthy riparian zone can improve agricultural water quality as well as enhance fish habitat. A healthy riparian zone is a vegetated length of native riparian trees, shrubs and grasses adjacent to a watercourse, which is stable and self-regenerating.

In agricultural areas, it is recognized that establishing tall trees may limit agricultural production and may be undesirable. However, there may be potential to offset this disadvantage by establishing trees that have a dual purpose, such as agricultural

production at the same time as improving fish habitat. For example, some farmers have established Hazelnut trees adjacent to the watercourse, thereby creating shade, limiting the growth of instream grasses, as well as providing bank stability and improved fish habitats.

A healthy riparian area can provide the following benefits to agriculture as well as fish habitat:

- Vegetation shades the water which keeps aquatic and shade intolerant vegetation under control. It helps to reduce summer high water temperatures which is better for livestock and fish and it provides natural insulation during the winter thereby reducing freezing and preventing damage to pumps and waterlines.
- Establishing native vegetation can outcompete noxious weeds and prevent or help to reduce the growth of noxious weeds, especially if appropriately managed to ensure that species that inhibit the growth of noxious weeds are planted.
- Riparian vegetation can reduce the impacts of farm activities on water quality by filtering sediments, absorbing nutrients and removing some pesticides.
- Vegetation provides natural stream bank sediment and erosion protection and helps to prevent losses of topsoil from fields.
- Riparian vegetation provides cover and shelter for fish and aquatic species, which can protect them from predators throughout the year.
- Riparian vegetation provides fish with a source of nutrients and food (e.g. leaf litter and insect drop, respectively).

7. Maintenance or Repair of Instream Structures on a Constructed Ditch

Maintenance works to instream structures that are licenced under the *Water Act* may be done without contact to MELP or DFO. Maintenance works must be done in a manner that do not impact fish or fish habitat. Irrigation gates, livestock crossings and other structures that are not licenced require a Ditch Maintenance Form to be forwarded to DFO prior to maintenance works being done.

Appendix A – Legislation

In British Columbia, Fisheries and Oceans Canada retains statutory authority for the protection of fish habitat and water quality pertaining to fish habitat under the federal *Fisheries Act*. The provincial government through the legislative mechanisms of the *Water Act* and *Fish Protection Act* manage some aspects of freshwater environments.

A.1 Federal *Fisheries Act*

The *Fisheries Act* is Federal legislation dating back to the time of Confederation. It was established to managed and protect Canada's fisheries resources. It applies to all fishing zones, territorial seas, and inland waters of Canada, and is binding to the Federal, Provincial and Territorial Governments, Local Governments, First Nations and the general public.

As Federal legislation, the *Fisheries Act* supersedes provincial legislation when the two are in conflict. Consequently, works undertaken in accordance with provincial legislation must meet the requirements of the *Fisheries Act*. The effects of watercourse maintenance activities on fish and fish habitat must, therefore, be addressed before a maintenance project is started.

The sections of the *Fisheries Act* that most often apply to ditch maintenance works include (the following is not an official version of the law):

Section 32: No person shall destroy fish by any means other than fishing except as authorized by the Minister or under regulations;

Section 35: No person shall carry on any work or undertaking that results in the harmful alteration, disruption, or destruction of fish habitat, except in circumstances where an authorization is issued by the Department of Fisheries and Oceans prior to the works being conducted; and

Section 36(3) The *Fisheries Act* prohibits the deposit of deleterious (toxic or harmful) substances into fish-frequented waters or in a place or under any condition where it may enter fish-frequented waters.

What is a deleterious substance? A substance is deleterious if it is harmful to fish, if it limits the use of fish by humans (for example contamination of fish by dioxins or shellfish by E. coli), or if by going through some process of degradation, it harms the water quality (e.g., oxygen depleting wastes). A substance is also deleterious if it exceeds a level prescribed by *Fisheries Act* regulations.

Section 2 of the *Fisheries Act* defines fish as:

(a) parts of fish,

(b) shellfish crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and

(c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals;

For the purposes of sections 35 to 43 of the *Fisheries Act*, fish habitat is defined as:

spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

In situations where it is unclear whether or not a proposed work will impact fisheries resources early consultation with DFO is recommended to ensure that works are conducted in accordance with the *Fisheries Act*.

A.2 Provincial *Water Act*

The first water use legislation in BC was passed in 1859. It was designed to respond to the needs of the day, conferring powers to grant water rights and collect water use fees. But its main thrust was to ensure long-term water supply for farmers, miners and other settlers. The *Water Act* has been amended several times with other facets of water management, such as the need to regulate activities in and around streams. The *Water Act* only applies to natural and channelized streams or source of water supply, whether usually containing water or not, ground water, and a lake, river, creek, spring, ravine, swamp and gulch. Ground water is not regulated at this time. Ownership of the water and most stream beds is vested in the Crown.

Section 9 of the *Water Act* of BC regulates changes in and about a stream:

(1) The comptroller, a regional water manager or an engineer may grant an **approval** in writing authorizing on the conditions he or she considers advisable

(a) a person to make changes in and about a stream

(b) a minister of the Crown, either in right of Canada or of BC, to make changes in and about a stream, or

(c) a municipality to exercise its powers under Division 3 and 4 of Part 16 of the *Municipal Act.*

(2) A minister or other person or a municipality may only make changes in and about a stream in accordance with an approval under this section or in accordance with **regulations** or a licence or order under the Act.

Part 7 of the Regulation under British Columbia's *Water Act* was originally proclaimed in June 1995 and was intended to reduce the number of routine activities/works in and about a stream which required an Approval under the *Water Act.* It ensures that water quality, riparian habitat, and the rights of licensed water users are not compromised. Under the Regulation, a person may carry out a number of routine works, provided that the general conditions and notification requirements are met.

A.3 Provincial Fish Protection Act

British Columbia's *Fish Protection Act* was developed to ensure that fish and fish habitat are sustained for present and future generations. Under this act stream protection provisions for residential, industrial and commercial areas have been enacted. A riparian audit process is being developed for agricultural areas.

Appendix B.

Ditch Maintenance Form
(for Works in a Wet Constructed Ditch)

APPLICANT INFORMATION

Name: _____ Telephone: _____

Address: _____ Fax: _____

LOCATION OF WORKS (be specific, include map if available)

Ditch Name (if available) :

Length of Maintenance Works: _____ m Habitat Classification (if available) _____

Fish Presence _____ Unknown _____

ANTICIPATED WORK DATES _____

(NO LESS THAN 14 DAYS NOTICE IS REQUIRED)

DESCRIPTION OF WORKS CONDUCTED IN A WET CONSTRUCTED DITCH DURING JUNE 15 – SEPT. 30 (circle appropriate works).

- Localized pruning of riparian vegetation, which is overhanging into the wetted channel and obstructing water flow, to a point above the high water mark and/ or pruning of ditch bank vegetation to a height of not less than 4 meters. (> 100m)
- Hand *cutting* or machine mowing of emergent aquatic vegetation above the waterline of the ditch. (> 100 m)
- Hand *removal* of emergent aquatic vegetation from the thalweg (i.e. emergent aquatic vegetation along the edges of the ditch is not disturbed) (> 100m)
- Machine removal of riparian vegetation on the north and east side of a constructed ditch (wet or dry) only for the purpose of constructing an access for channel maintenance
- Installation, maintenance or cleanout of sediment traps which do not require the construction of any structures within the ditch (e.g. weirs, dams, trash racks, etc.)
- Localized removal of blockages to flow less than 5 meters in length (e.g. debris dams)
- Dredging or cleaning the entire bottom along a ditch length < 50 m / yr
- Replacement of an access road culvert with a culvert of increased length.
- New culvert installation that will not impact native trees and shrubs.
- Bank stabilization or repair by rip rap planted with vegetation, such as willows or other bio-engineered method (geo-fabric) if the area is less than 50 m^2.
- Construction of a livestock crossing through a constructed ditch
- Construction of new structures within the ditch e.g. irrigation gates
- Other works: _____
- ***PLEASE CHECK TABLE 2 FOR THOSE WORKS IN A WET CONSTRUCTED DITCH WHICH <u>DO NOT</u> REQUIRE SUBMISSION OF DITCH MAINTENANCE FORM.***
- ***ANY OTHER WORKS WILL REQUIRE AUTHORIZATION FROM DFO.***

SIGNATURE:

I acknowledge that I have read the guidelines and conditions attached:

Date: _____ Fax to DFO – see contact list in Appendix C

Signature: _____

Appendix C – Agency Contacts

Lower Mainland	
MELP Contacts	**DFO Contacts**
Regional MELP Office: 10470 152nd Street Surrey, B.C. V3R 0Y3 Fax: 604-930-7719 Phone: Water: 604-582-5229 Project Review: 604-582-5366 Switchboard: 604-582-5200	Fraser Valley Regional District contact: Fisheries and Oceans Canada Mission Office Fax: 604-814-1051 Phone: 604-814-1070 Cell: 604-807-7187
	Greater Vancouver Regional District Office contact: Fisheries and Oceans Canada Annacis Island Office Fax: 604-666-6617 Phone: 604-666-6479
	Squamish to Pemberton areas contact: Fisheries and Oceans Canada Squamish Office Fax: 604-892-2378 Phone: 604-892-3230
Web Addresses	
B.C. Ministry of Agriculture, Food and Fisheries	http://www.gov.bc.ca/agf/
B.C. Ministry of Environment, Lands and Parks	http://www.env.gov.bc.ca/sry/fwh/hp/hpemailform.htm
Department of Fisheries and Oceans	http://www.dfo-mpo.gc.ca/index.htm

Appendix C – Agency Contacts

Vancouver Island	
MELP Contacts	**DFO Contacts**
Notifications: Diane Bennewith Planning & Referral Technician Ph: (250) 751-7047 Diane.Bennewith@gems3.gov.bc.ca Sharon Erickson Environmental Assessment Officer Ph: (250) 751-3153 Sharon.Erickson@gems3.gov.bc.ca	**Duncan:** DFO Habitat Management Unit 5653 Club Road Box 241 Duncan, BC Phone: (250) 746-6221 V9L 3X3 Fax: (250) 746-8397
Approvals: Eileen Wright Licence & Permits Officer Ph: (250) 751-3125 Eileen.Wright@gems6.gov.bc.ca	**Pt. Alberni:** DFO Habitat Management Unit #250, 4877 Argyle Street Pt. Alberni, BC Phone: (250) 723-5063 V9Y 1V9 Fax: (250) 724-2555
Water Management/ Ditch Maintenance: John Baldwin Water Management Technician Ph: (250) 751-8142 John.Baldwin@gems3.gov.bc.ca	**Comox:** DFO Habitat Management Unit 148 Pt. Augusta Road Comox, BC Phone: (250) 339-2031 V9M 3N6 Fax: (250) 339-4612
Habitat Protection Guidance: Marlene Caskey Sr. Habitat Protection Officer Ph: (250) 751-3220 Marlene.Caskey@gems7.gov.bc.ca Bill Hubbard Planning and Assessment Officer Ph: (250) 751-3236 Bill.Hubbard@gems2.gov.bc.ca	**Campbell River:** DFO Habitat Management Unit 315 - 940 Alder Street Campbell River, BC V9W 2P8 Phone: (250) 850-5701 Fax: (250) 286-5852
Alternate Contact For All Purposes: Mike Lambert Regional Planning and Assessment Manager Ph (250) 751-3170 Mike.Lambert@gems2.gov.bc.ca	
MAILING ADDRESS: Ministry of Environment, Lands and Parks 2080A Labieux Road Nanaimo BC V9T 6J9 Fax: (250) 751-3103	

Appendix D – Reference Information

BC Ministry of Agriculture, Food and Fisheries	BCMAFF
BC Ministry of Environment, Lands & Parks	BCMELP
Department of Fisheries and Oceans	DFO
Irrigation Industry Association of British Columbia	IIABC

Title	Publisher	Material	Year	Cost	Location
BC Agricultural Drainage Manual	BCMAFF	Publication	1996	20.00	Abbotsford or WAIR
BC Sprinkler Irrigation Manual	IIABC	Publication	1991	15.00	IIABC
BC Trickle Irrigation Manual	IIABC	Publication	1999	30.00	IIABC
Beaver Dam Management	BCMELP Surrey	Factsheet	2001	none	Surrey
Bridge Maintenance Guidelines	DFO	Factsheet			
Expanding Existing Stream Crossings	BCMELP Surrey	Factsheet	2001	none	Surrey
Habitat Restoration Works	BCMELP Surrey	Factsheet	2001	none	Surrey
Maintaining Sediment Traps	BCMELP Surrey	Factsheet	2001	none	Surrey
Removal of Sediment, Debris and or Vegetation from a Stream	BCMELP Surrey	Factsheet	2001	none	Surrey
Replacing a Stream Crossing	BCMELP Surrey	Factsheet	2001	none	Surrey
So, You Want to Cross that Stream on Your Property	BCMELP Surrey	Factsheet	2001	none	Surrey
Stream Cleanup Guidelines	BCMELP Surrey	Factsheet	2001	none	Surrey
Streambank Stablization	BCMELP Surrey	Factsheet	2001	none	Surrey
Working in or About a Stream	BCMELP Surrey	Factsheet	2001	none	Surrey
Watershed Stewardship, A Guide for Agriculture	DFO	Publication	1996	none	Vancouver